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European Regions Financing Public e-Services: the Case of EU Structural Funds

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Abstract

EU Structural Funds represent by far the main source of funding for innovation in general and for e-services in particular in the lagging regions of Europe classified into the "Convergence" objective. The paper explores the amount of resources dedicated to public e-Services and Information Society by elaborating European Commission data on programmed resources for the 2007-13 period. Moreover, the paper represents the first attempt to use a quantitative approach – i.e. a principal component analysis and a cluster analysis – in order to identify the different strategies adopted by European Regions for Information Society development. The results shows that in the "Convergence" Regions, a specific "public e-services strategy" emerges. Regions investing in public e-services tend to concentrate available resources to e-government or e-health, while very low percentage of total funding is dedicated to the other categories such as broadband or infrastructural services.

JEL Classification: H830, 0330, O380

Keywords: Information society, regional policy, Cohesion Policy, Structural Funds, e-Services, e-Government, Cluster analysis.

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1 Introduction

ICT is considered as a major source of economic growth and is responsible for 5% of EU GDP (European Commission, 2010b). The role of ICT in fostering productivity and growth has been highlighted by a growing body of literature (see for example Van Ark et al., 2008 and Meijers, 2010).

The Digital Agenda (European Commission, 2010c) of the European Union succeeded in 2010 to a series of strategies and policy frameworks for public e-Services and Information Society (IS) concieved at the European level over the last ten years. This initiative, one of the key component of the whole Europe 2020 growth strategy, aims at maximising the social and economic potential of ICT and indentifies a number of obstacles and bottlenecks that are currently jeopardizing the development of IS. They include the lack of effective interoperability and coordination between public authorities; low investments in fast, open and competitive internet networks; insufficient research and innovation efforts; lack of digital literacy and skills.

EU regions are becoming increasingly important when dealing with all these issues. Even though their institutional competences and innovation leadership vary significantly across Europe (Nauwelaers and Wintjes, 2011), their institutional powers and role have increased in the last two decades in several countries. Likewise, regional innovation and technology policies gained momentum and legitimation, while theoretical concepts such as the regional innovation systems (RIS) help to describe the variety of multiple development patterns and growth models (Cooke and Morgan, 1998; European Commission, 1998).European regions can be considered as crucial nodes of the governance of innovation. They are embedded in a multi-level governance network that includes EU institutions, national and local governments, which needs both vertical and horizontal co-ordination in order to be effective (OECD, 2011; OECD, 2009).In particular, within IS and public e-Services development, regions can play a pivotal role as an intermediating agent between national top-down initiatives (e.g. on interoperability, standard setting, e-ID, etc.) and the bottom-up efforts of local administrations (Tsipouri, 2002). For example, the implementation of interoperable e-government networks requires a high level of inter-agency coordination and cooperation which is more easily manageable at the regional level. The promotion of re-use practices avoid costly duplication of software development, while the transfer of experiences from advanced administrations to laggard ones – even when promoted by national authorities – need to be managed in a decentralized way.

The definition of effective IS strategies at a regional level is therefore a key element in order to ensure not only the effectiveness of local actions but also the necessary co-ordination with European and national frameworks. Establishing the right policy mix, which should be based on local assets, helps to avoid traps such as the duplication of competencies and plans and the presence of policy gaps, i.e. areas of intervention not covered (Bonaccorsi, 2010b).

The exploration of these different regional models is usually carried out through a qualitative approach, e.g. by reviewing policy documents and strategic frameworks, which may or may not contain quantitative indications of strategic priorities. Otherwise, a more precise picture can be drawn by comparing the amount of financial resources actually dedicated to the main areas of intervention. Regional policies co-financed by the EU Structural Funds represents an ideal context to test such a quantitative comparison, since European Cohesion Policy (a) is the main – or the only in many cases – source of funding for investment in innovation in the lagging regions of Convergence objective (Bonaccorsi, 2010a) and (b) forces EU Regions to share the same rules and regulations when programming and implementing actions, which implies that funding is allocated and classified through common categories and definitions.

The purpose of the paper is twofold. First, to draw a picture of the role of European Cohesion Policy in co-financing regional policies on IS and public e-Services. Second, to investigate the existence of different patterns – corresponding to different strategies – in the allocation of the financial resources among the regions that the European Cohesion Policy classifies into the Convergence (CONV) objective.

To the best of our knowledge, this is the first attempt to use a quantitative approach in order to analyze the different regional strategies for IS development in Europe.

The analysis is conducted with respect to the programming period 2007-13 and is based on an official dataset provided by the European Commission (DG Regional Policy) in July 2009. The analysis investigates the total amount of European Structural Funds that have been programmed by every Member State at the national and regional level for the development of the IS and, in particular, to the category of expenditure “Services and applications for the citizen (health, administration, education)”.

2 The regional dimension of innovation policies

The recent economic literature pointed out that the tendency toward spatial concentration in innovation policies has become more clear over time (Feldman 2000). In particular the regional dimension in the R&D activity constitutes a marked tendency in many industrial countries, even where the national level is traditionally stronger. (Cooke et al. 1997). The basic idea is that "the region is increasingly the level at which innovation is produced through regional networks of innovators, local clusters and the cross-fertilizing effects of research institutions" (Lundvall and Borras 1999, p. 39).

Many relevant arguments have been added by the economic literature to explain the main rationales for the regional dimension in innovation policies (Bonaccorsi 2010b). More specifically three lines of research -which are strongly linked and even overlapping – seem relevant here.

First of all, the concept of Regional Innovation Systems (RIS) is well known both in regional economics and economics of innovation. The main rationale is that a firm is unable to innovate by herself, without any contact with the other local agents. Interaction with customers, suppliers, competitors as well as and public institutions is very important, and a ''system perspective'' is the paradigm for studying such interaction. The notion of RIS has been introduced since the early '90s (Cooke, 1992; Cooke and Morgan, 1998, Asheim 1995, Asheim and Isaksen 1997), as an extension of the concept of National Innovation System (NIS) studied by Lundvall (1992) and Nelson (1993). Three different types of RISs have been identified (Asheim and Gertler 2004). The *territorially embedded regional innovation systems* (TERIS), where firms (primarily those employing synthetic knowledge) base their innovation activity mainly on localized learning processes stimulated by geographical, social and cultural proximity, without any strong interaction with knowledge organizations. The best example are the networks of SMEs in industrial districts, such as the district of Emilia Romagna in Italy. The second type is the *regionally networked innovation system* (RNeIS), where firms and organizations are still implanted in a specific region and characterized by localized, interactive learning. The network approach is most representative of Austria, Germany, and the Nordic Countries. The third type is the *regionalized national innovation system* (RNaIS) where the innovation activity takes place mostly in cooperation with actors outside the region at a both national and international level. Thus the RIS could be thought of as a part of a greater innovation system. A good example is the clustering of R&D laboratories of large firms and

research centres in planned “science parks”, such as the Technopoles, developed by France, Japan, and Taiwan.

A second approach refers to knowledge spillovers and complementarity between human capital and R&D as crucial elements to foster innovation activity. It is clear that such elements have a localized dimension and the regional could be the optimal scale for maximizing the effects on innovation. Knowledge spillovers and complementarity between human capital and innovation activity are the key elements of the endogenous growth theory (Romer 1990) and neo-shumpeterian theories (Aghion and Howitt 1992, 1994, 1998). What makes endogenous growth theories endogenous is that growth is a consequence of scale and accumulation. Instead of assuming that growth is determined exogenously, endogenous growth theorists posit a mechanism that generates a positive relationship between scale and productivity. The impact of the posited mechanism is to offset, and in most cases outweigh, the impact of diminishing returns.

Two common ways that EGT incorporates the assumption of growth are in the form of spillovers, and by the assumption of increasing returns. Spillovers occur when the accumulation of an input has an unintended (and unrewarded) positive effect on productivity. As capital is accumulated, productivity rises to offset diminishing returns. One feature of models that assume spillovers is that there is underprovision of the input that is the source of the spillover.

Particularly interesting is a quite new trend in endogenous growth theories started with a short paper by Nelson and Phelps (1966) which analyzes complementarity between R&D and investments in human capital. Such line of research does not consider human capital as a factor in growth accounting[1], since it facilitates technology adoption and diffusion[2]. In particular, a crucial paper is the one developed by Redding (1996), which analyzes low-skill low-quality traps, caused by strategic complementarity between homogeneous human capital (education investment) and R&D, within an imperfect labour market. In that model, human capital is assumed as an aggregate stock and the "many interesting issues concerning the heterogeneity of skills are left to one side” (Redding 1996, p. 458). More recently, Scicchitano (2010), by introducing the heterogeneity of human capital, through two different training systems, investigates the interaction between

[1] See Benhabib and Spiegel (1994).

[2] See for example, empirical studies by Bartel and Lichtenberg (1987), Benhabib and Spiegel (1994), Hall and Jones (1999). From the theoretical point of view, in particular, Lloyd-Ellis and Roberts (2002), by demonstrating that the interaction between skills and technology at the aggregate level exhibits bounded complementarity, point out the implications for growth.

heterogeneous human capital and R&D and its implications for growth. In particular, the paper demonstrates that human capital heterogeneity can avoid low development traps when R&D is absent, by showing that the lack of innovations, which in Redding's model is the necessary and sufficient condition for the creation of low-skill low-quality trap, is now only necessary.

Obviously, such models demonstrate that growth rate depends upon all agents operating into the "localized innovation system". More specifically, workers' investment in human capital depends upon the extent to which they expect the entrepreneur to engage in R&D. Entrepreneurs' decision on whether or not to invest in R&D depends upon their expectation on workers' investment in human capital.

In this context public policy is a crucial element since because of its role in fostering human capital accumulation and innovation activity.

The third line of research refers to agglomeration economies, clusters and industrial districts. The basic idea is that when many firms operate in the same localized area – typically at a regional scale - positive externalities could be easily generated. Most often firms share the same workers and can easily hire them because of a great mobility in the labour market. At the same time workers are more likely to invest in human capital because they predict a straightforward spending of such skills amongst firms. Moreover, the regional policy has a relevant role in creating and maintaining such mechanisms by promoting direct linkages amongst firms workers and private and public research centres. Such arguments have been extensively analyzed by well known economists such as Becattini (1979) and Porter (1990).

3 Innovation, Information Society and European Cohesion policy

European Cohesion policy, otherwise named European Regional Policy, *"aims to promote harmonious development of the Union and its regions by reducing regional disparities"* (Article 174 of the Treaty). This policy is implemented mostly thanks to two Structural funds, namely the European Regional Development Fund (ERDF) and the European Social Fund (ESF). ERDF is aimed at levelling economic differences among regions and it finances, for example, initiatives for research and innovation, local development and employment, infrastructure, and protection and improvement of the environment. ESF was established to improve the quality and accessibility of jobs and employment opportunities within the European Union. In addition to the Community

financing, substantial national and regional budgets are mobilised, which must conform to EU rules and regulations.

EU Cohesion Policy "*underpins the growth model of the Europe 2020 strategy including the need to respond to societal and employment challenges all Member States and regions face"* (European Commission, 2010a). Structural Funds are mentioned as one of the key sources of funding for the implementation of the whole Europe 2020 strategy in general, and for "Innovation Union" and "Digital Agenda" flagship initiatives in particular (European Commission, 2010b). The rationale for an intervention by the Cohesion Policy in the development of IS lies in the large disparities between countries and regions in terms of adoption of ICT and of modern telecommunications in particular (European Commission, 2010a). For example, in 2009 the extent of broadband coverage is much less in *Convergence* (CONV) regions (47% of the population covered) than *Regional competitiveness and employment* (COMP) ones (68% covered) (European Commission, 2010c).

In the 2007-13 programming period, the issue is addressed at a strategic level by the *Community strategic guidelines on cohesion policy* (European Council, 2006). The document not only highlights the central role of research, innovation, entrepreneurship and information society in promoting sustainable development, but also introduces an integrated strategic approach binding together the research and innovation (RTDI) and the ICT / IS components of regional innovation policy. In particular, the guidelines for IS development include actions for

- ensuring uptake of ICTs by firms and households and promoting development through balanced support for the supply and demand of ICT products and both public and private services;
- ensuring availability of ICT infrastructure and related services where the market fails to provide it at an affordable cost and to an adequate level to support the required services, especially in remote and rural areas and in new Member States.

Furthermore, a special attention is devoted to multi-level governance, since cohesion policy encourages the development of partnerships amongst different actors such as national and regional or local authorities, business, universities, etc.

Such a specific focus on research, innovation and IS is confirmed in the 2007-13 Regulations. In particular, the European Regional Development Fund (ERDF) Regulation (n. 1080/2006) addresses innovation extensively. A particular role of innovation is highlighted in the case of the *Regional competitiveness and employment* objective (Article 5). Innovation is also a strong component of the two objectives *Convergence* (Article 4) and *European territorial cooperation* (Article 6).

Each article provides a list of policy priorities that should be included in 2007-13 Regional Operational Programmes. IS is explicitely mentioned only in Article 4 (Convergence objective). This implies that IS policies are strongly recommended for the less advanced regions of Europe, while the other regions can decide whether to include them in their programming documents. In particular, within the Convergence objective, IS development should be focused on *"the development of electronic communications infrastructure, local content, services and applications, improvement of secure access to and development of on-line public services; aid and services to SMEs to adopt and effectively use information and communicaion technologies (ICTs) or to exploit new ideas"*.

4 Data source

The analysis is based on the official dataset on EU Structural Funds programmed resources for the period 2007-13. The dataset is provided by the European Commission – DG Regional Policy and includes data on the amount of financial resources by Operational Programme (OP) and by catetegory of expenditure. The OPs that were formally approved in July 2009 were taken into account.

As showed in Table 1, Operational Programmes are classified into various categories depending on the objective (Convergence, Regional Competitiveness and Employment, European Territorial Cooperation), the fund (European Regional Development Fund, European Social Fund) and the territorial scale (National or Multiregional, Regional). Programmes with territorial cooperation objectives, by definition, involve more than one Member State, and therefore could not be connected to any particular country.

In our analysis we consider all the OPs except those of Territorial Cooperation (Cross-border cooperation, Interregional cooperation, Trans-national cooperation), which involve by definition more than one member state and accounts only to about 2% of total funding.

[table 1]

Since the OPs show different territorial scope, namely regional, national and multiregional, a matching with the Eurostat database of EU Regions (NUTS2 level) has been performed in order to

estimate the programmed amount of resources at regional level. In particular, the total amount of national and multiregional Programmes has been equally assigned to all regions directly involved in each Programme.

Consequently, the amount of Structural Funds assigned to each region is calculated as the sum of: (a) the amount of resources allocated by the regional OPs (typically, the ERDF regional OP plus the ESF regional OP) and (b) the share of national or multiregional OPs that involve that specific region.

According to the Council Regulation No. 1083/2006 of 11 July 2006, the contribution of Structural Funds to each policy priority (research and innovation, human capital, transport, energy, environmental protection, culture, etc.) has to be classified into "categories of expenditure", otherwise named "prioriy themes".

More specifically, the Annex II provides a list of 86 categories of expenditure to be used over the entire programming period as a common unit of analysis for the reporting on policy implementation. In particular, the following 6 categories (from no. 10 to no. 15) are dedicated to the IS in general, while n. 13 is devoted to public e-Services development and diffusion:

10. Telephone infrastructures (including broadband networks)
11. Information and communication technologies: access, security, interoperability, risk-prevention, research, innovation, e-content, etc.
12. Information and communication technologies (Trans-European Network-ICT)
13. Services and applications for the citizen (e-health, e-government, e-learning, e-inclusion, etc.)
14. Services and applications for SMEs: e-commerce, education and training, networking, etc.
15. Other measures for improving access to and efficient use of ICT by SMEs

In what follows, our analysis will be conducted with regard to these five categories of expenditure as the total amount of the IS and to category no. 13 on e-Services.

5 Stylized facts: Structural Funds allocated to e-Services and Information Society

European Cohesion Policy covers more than one third of the European budget and amounts to almost 344 billion euros. 281 billion euros were allocated to the Convergence objective (CONV), 56 to the "Regional Competitiveness and Employment" objective (COMP) and 7 to the "European territorial cooperation" objective. With respect to the main instrument, the ERDF is the most relevant fund (with almost 278 billion euros), while the ESF amounts to 76 billions.

In particular, 15.2 billion euros are allocated to the IS, while more than 5.2 billions to public e-Services (Table 2), one third of the total. The fact that the e-Services category is prevailing among the policy options available to EU regions confirms the long-standing trend in EU policy to invest in e-government, in order not only to obtain efficiency and effectiveness gains in the provision of public services, but also to improve role of governmental bodies in public procurement of advanced technology (Edquist *et al.*, 2000).

The second highest amount of resources (4.1 billion euros, 27%) is classified into categories "ICT" and "ICT in the TEN networks"[3] (no. 11 and 12), which we have grouped together because of their evident similarities. These categories include not only infrastructural services (other than broadband networks) such as access, security and interoperability, but also more generic type of interventions as risk-prevention, research, innovation, e-content.

[table 2]

5.1 Regional Development Fund vs. Social Fund

According to the Council Regulation No. 1080/2006 of 5 July 2006, the Regional Development Fund (ERDF) co-finances a large spectrum of actions aimed at fostering Information Sociery, including: the development of electronic communications infrastructure; the development of advanced content, services and applications, the improvement of secure access to and development of on-line public services; aid and services to SMEs to adopt and effectively use information and communication technologies (ICTs) or to exploit new ideas. Thus, the large majority of financial resources for IS (15 billion euros) and e-services (5) comes from the ERDF (fig. 1), while the ESF –

[3] Actions for the diffusion of ICTs connected to the Trans-European Networks.

which is competent for the dissemination of information and communication technologies and e-learning, as from the Council Regulation No. 1081/2006 of 5 July 2006 - allocates respectively 128 and 90 million euros.

[Figure 1]

As already reported, CONV Objective absorbs the majority of Structural Funds. Regions belonging to CONV objective planned to invest almost 12,5 billion euros for the IS (almost 4,5 for the public e-service). The expected investment by COMP regions is about 6 times lower than those of CONV Objective. It is interesting to note that, while the financial effort from COMP Objective is limited in absolute values, they show the highest value in relative terms.

5.2 Financial resources at the national level

Figure 2 and 3 show the amount of Structural Funds allocated to IS and e-Services (category no. 13) by the EU Regions and aggregated at a national level.

[Figure 2] and [Figure 3]

In absolute terms (Figure 2), Poland is the country with the largest amount of resources allocated both to IS (3,7 billion) and e-services (almost 1 billion), followed by Greece, Spain, Slovak Republic and Czech Republic. Interestingly enough, Italy is the second country in terms of resources devoted to IS (more than 1,6 billion), but only the sixth in terms of funds for e-services (309 million of euro).

As reported in Figure 3, the Slovak Republic shows the highest values with respect to both e-services and IS resources over the total amount of Structural Funds available. Greece and Finland also show relatively high values, while Poland, which is the Member State that received the largest amount of Structural Funds in 2007-13 period, is now just over the European average.

Data shows a significant variation in the amount of resources dedicated to e-services actions, especially if compared to the resources dedicated to other IS themes. For example, in Countries such as Spain, Estonia, Malta or Slovak Republic e-services investment represents more than the

half of IS total investment. Other Countries, such as Sweden, Denmark or Italy, seem to focus on other priorities classified into the remaining IS categories of expenditure (10, 11, 12, 14, 15).

5.3 Financial resources at the regional level

In order to explore the allocation of Structural Fund in each single EU Region, we performed two distinct univariate cluster analyses and classified the European Regions into homogeneous classes based upon the allocation of funds to (a) IS in general (categories from no. 10 to no. 15) and (b) e-Services in particular (category no. 13).

The Jenks optimization method, also known as the goodness of variance fit (GVF) was applied (Jenks and Coulson, 1963; Jenks, 1967). The method assigns the highest values observed to the first cluster, and the lowest to the fifth cluster, while the remaining values are classified into intermediate classes by minimizing the squared deviations of the class means.

In other words, this technique first orders the values from low to high. It then calculates the sum of squared difference (SSD) for the possible first breaks, calculating the SSD for every possible break. It then finds the SSD for each of the next possible breaks, as if a previous break had already happened. It determines the SSDs for all of the requested breaks, and then it chooses the best last break from the last list of SSDs, the best second to last break from the second to last list, etc. This provides the best set of breaks from the entire list of possible breaks:

$$SSD_{i..j} = \sum_{n=i}^{j} \left(A[n] - mean_{i..j}\right)^2 \qquad (1)$$

which can be substituted to

$$SSD_{i..j} = \sum_{n=i}^{j} A[n]^2 - \frac{\left(\sum_{n=1}^{j} A[n]\right)^2}{j-i+1}$$

where:

- A is the set of values that have been ordered from 1 to N.
- $1 \leq i < j < N$
- Meani..j is the mean of the class bounded by i and j[4].

[4] Optimization is achieved when the quantity GVF is maximized. There are four steps that must be repeated:
1. Calculate the sum of squared deviations between classes (SDBC).

For both the analyses we provide a schematic and a cartographic representation; the codes of the Regions mentioned in the tables are reported in Table 8 and Figure 7 (see Annex). With respect to the total of IS (Table 7 and Figure 5), Italian region of Campania shows the largest amount of investments (almost 535 million euros). Also Polish regions of Západné Slovensko, Stredné Slovensko and Východné Slovensko (Slovack Republick – 367 milion euros each), Mazowieckie (341) e Slaskie (337) belong to the cluster 1. Puglia (305) and Sicily (258) in Italy, Attiki and Anatoliki Makedonia (Greece), Latvia, Lithuania, Centro and Norte (Portugal) show a relatively lower amount of resources compared to the first group and are therefore classified into cluster 2.
With regard to the planned funds for e-services (Table 8 and Figure 6), all the regions in Slovack Republic except Bratislavsky have planned high investments in e-Services (more than 189 million euros). Campania (147,5 milion of euros), Andalucia (Spain) and Attiki (Greece) are positioned in the first cluster. Sardinia in Italy plus 3 Spanish, 7 Greek and 10 Polack Regions, Pas-de-Calais (France), Észak-Magyarország (Hungary) belong to the second cluster.

6. Identifying regional strategies for e-Services development in the Convergence objective

This section aims at identifying the different strategies EU regions are following to foster ICT and IS development.
Our analysis is limited to the lagging regions belonging to the CONV objective. As explained before, although no hard evidence is available about the total amount of resources that each EU region can leverage, which include all possible source of funding, it could be assessed that the Structural Fund represent a good estimate of the total resources available to a region only in the case of the Convergence (CONV) objective, while in more advanced regions of the

2. Calculate the sum of squared deviations from the array mean (SDAM).
3. Subtract the SDBC from the SDAM (SDAM-SDBC). This equals the sum of the squared deviations from the class means.
4. After inspecting each of the SDBC, a decision is made to move one unit from the class with the largest SDBC toward the class with the lowest SDBC

In other words, the method first specifies an arbitrary grouping of the numeric data. SDAM is a constant and does not change unless the data changes. The mean of each class is computed and the SDCM is calculated. Observations are then moved from one class to another in an effort to reduce the sum of SDCM and therefore increase the GVF statistic. This process continues until the GVF value can no longer be increased. Thus, an iterative algorithm is used to optimally assign data to classes such that the variances within all classes are minimized, while the variances among classes are maximized.

Competitiveness (COMP) objective other sources of funding (national, regional, etc.) may be prevailing. In fact, compared to the COMP objective, CONV regions not only can benefit from an amount of Structural Funds one order of magnitude higher (see Figure 1) – which is mainly due to the fact that, according to ERDF Regulation, IS is a policy priority only in the case of CONV regions – but also tend to invest the few local resources available to the improvement of low-tech basic public services such as transport infrastructures, water management, energy, etc.
Convergence objective covers regions whose GDP per capita is below 75% of the EU average, which are almost exclusevely located in Southern and Eastern Europe (see Figure 8 in the Annex).

In order to verify the presence of different strategies, we take into account the amount of resources allocated to the five categories of expenditure showed in Table 2, as a percentage of the total funding dedicated to IS development.

[table 3] and [table 4]

A Principal Component Analysis (PCA) is applied, followed by a hierarchical Cluster Analysis (CA). The PCA found 4 dimensions in the data, each of which accounted for between 36.9% and 13.3% of the total variation in the data (see Table 4). We will consider the first two dimensions, which individually accounted for the largest amount of variation in the data (64,1%).

[table 5] and [figure 4]

Figure 4 shows the plot of the variables included in the PCA according to their scores in dimensions 1 and 2. Where variables are closely grouped together, they show high levels of association. The figure also shows the location of the three clusters identified through the CA (yellow circles).
The first cluster is located at the left of Figure 4 (*Cluster 1*), and group together the EU regions that have allocated the majority of their financial resources (59% on average, as showed in **[table** 5] and) to the infrastructural services connected to the ICT development such as interoperability, security, access or to other type of interventions such as risk-prevention, ICT research. The variable "ICT" is in fact negatively correlated with the other variables. Another cluster appears at the top-right of Figure 4 (*Cluster 2*). The group is defined by the strategic choice to invest mainly in public e-Services (55%), while the other categories presents very similar levels of allocation (about 10%). A

third cluster is found at the bottom-right corner of the plot (*Cluster 3*). This group is defined by a relatively high proportion of total expenditure devoted to both ICT development among SMEs (40%) and broadband networks (25%). These variables, showing a similar location in the space defined by the first two dimensions, show in fact the highest degree of correlation with each other.
The dimension of the yellow circles in Figure 4 is proportional to the number of regions belonging to each cluster revealed. The third cluster is in fact the largest group both in terms of number of regions belonging to it (41%) and amount of total resources devoted to IS (38%). Cluster 1 and cluster 2 show the same number of regions (29%), but different amount of total resources (33% and 28% respectively).

[table 6]

Finally, Table 6 classifies EU regions into the three clusters by reporting the name of the Member State and, in parenthesis, the name of the region whenever two or more regions of the same State belong to different clusters.
These results suggest the presence of a specific strategy focusing on public e-Services development. Almost one third of EU regions belong to the second cluster and thus devote the majority of their resources to ICT in public services. They concentrate available funding to e-government or e-health, and very low percentage of total funding is dedicated to the other categories such as broadband or infrastructural services. While funds dedicated to ICT diffusion among enterprises are always accompanied by measures for broadband penetration, resources for e-services "stand alone", and show low correlation with the other components of Information Society funding.
Since broadband networks and other infrastructural services such as technologies for interoperability, access, e-ID, etc. are considered as pre-requisites for the diffusion of effective e-Services (Millard, 2004), a strategy only focused on the improvement of public services might lead to an unbalanced development. This might lead to a bias towards the front-office component of public e-Services position, while the importance of other key aspect such as connectivity or back office integration could be underestimated.

7 Conclusions and further research

It is well known that EU Structural Funds represent by far the main source of funding for innovation in general and for e-services in particular in the lagging regions of Europe classified into the "Convergence" objective.

Therefore, the amount of European Structural Funds allocated to IS and public e-Services policies could be considered as a good indicator of the level of commitment to IS development and public services transformation by European Regions, or at least by those belonging to the Convergence objective.

Using evidence on Structural Funds allocated to Information Society by all European regions, we explored the contribution of European Regional Policy to public e-services development and diffusion across Europe through two different analyses.

In the first part of the paper, we provided key figures at European, national and regional level showing the amount of programmed funding dedicated to this topic by Fund, objective, Member State and region (NUTS2). Such a detailed picture is provided for the first time and may also represent a useful tool for benchmarking purposes at regional level.

In the second part of the paper, we explored the different models that the regions belonging to the CONV objective has developed for the programming period 2007-13. Three different strategies were identified: the first is based mainly on the development of ICT infrastructural services such as interoperability, e-identification, access; the second is focused on e-Services provision and the third on a policy mix that include the development of broadband networks together with the introduction of the ICTs in enterprises. The first strategy is prevailing in terms of number of regions that are pursuing it (41%).

Further research could focus on the determinants not only of the total amount of money devoted to IS and e-Services but also of the strategic choices that regions have done. For example, the institutional context as well as the socio-economic condition of the territory are expected to influence the decisions on the allocation of financial resources to the different topics analyzed.

Besides, a better picture of actual actions undertaken at regional level could benefit from the use of updated information on the implementation phase of the policy. For example, a comparison between programmed funding for IS and financial resources actually paid out after a few years

could represent a useful test of the sustainability over time of the strategies that were adopted in the programming phase.

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Tables and figures

Table 1. Operational Programmes co-financed by Structural Funds, by country, objective, Fund and territorial scope

	Territorial objective*			Fund		Nat / reg		
	Convergence	Comp.	Cooperation	ERDF	ESF	National or multireg.	Regional	All Operational Programmes
BG	7	-	-	5	2	7	-	**7**
BE	2	8	-	4	6	1	9	**10**
CZ	15	2	-	14	3	8	9	**17**
DK	-	2	-	1	1	2	-	**2**
DE	14	22	-	18	18	1	35	**36**
EE	3	-	-	2	1	3	-	**3**
GR	14	-	-	10	4	5	9	**14**
ES	23	22	-	23	22	7	38	**45**
FR	9	27	-	31	5	5	30	**36**
IE	-	3	-	2	1	1	2	**3**
IT	19	33	-	28	24	9	43	**52**
CY	1	1	-	1	1	2	-	**2**
LV	3	-	-	2	1	3	-	**3**
LT	4	-	-	2	2	4	-	**4**
LU	-	2	-	1	1	2	-	**2**
HU	14	1	-	13	2	8	7	**15**
MT	2	-	-	1	1	2	-	**2**
NL	-	5	-	4	1	5	-	**5**
AT	2	9	-	9	2	1	10	**11**
PL	21	-	-	20	1	5	16	**21**
PT	11	3	-	10	4	7	7	**14**
RO	7	-	-	5	2	7	-	**7**
SI	3	-	-	2	1	3	-	**3**
SK	10	1	-	9	2	9	2	**11**
FI	-	7	-	5	2	-	7	**7**
SE	-	9	-	8	1	1	8	**9**
UK	6	16	-	16	6	-	22	**22**
Cross-border cooperation	-	-	54	54	-	-	-	**54**
Interreg coop	-	-	3	3	-	-	-	**3**
Trans-national cooperation	-	-	14	14	-	-	-	**14**
Total	**190**	**173**	**71**	**317**	**117**	**108**	**254**	**434**

** Programmes belonging to both Convergence and Competitiveness objectives are classified into Convergence objective*

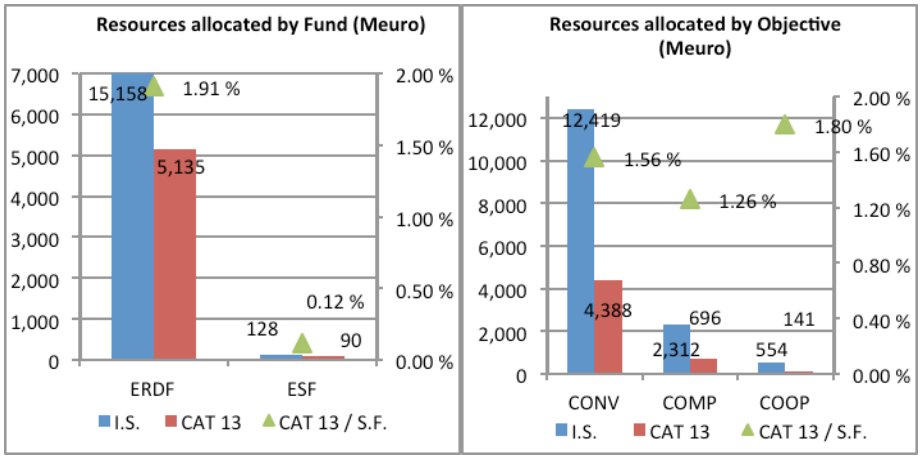
Source: Own elaboration from European Commission - DG for Regional Policy data

Table 2. Categories of expenditure dedicated to IS and public e-Services and financial resources allocated in both CONV and COMP objectives

N.	Name	A.V.	%
10	Broadband networks	2,257,722,464	15%
11 + 12	Information and communication technologies (interoperability, security, etc.)	4,121,115,554	27%
13	**Services and applications for citizens**	**5,225,072,351**	**34%**
14	Services and applications for SMEs	2,144,358,160	14%
15	Other measures for improving use of ICT by SMEs	1,537,162,147	10%
	Total	*15,285,430,676*	*100%*

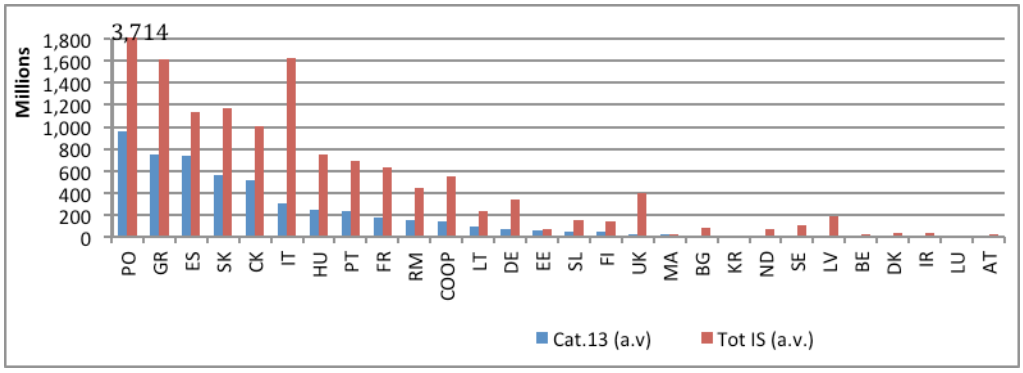
Source: Own elaboration from European Commission - DG for Regional Policy data

Fig. 1. Financial resources allocated by Fund and Objective.



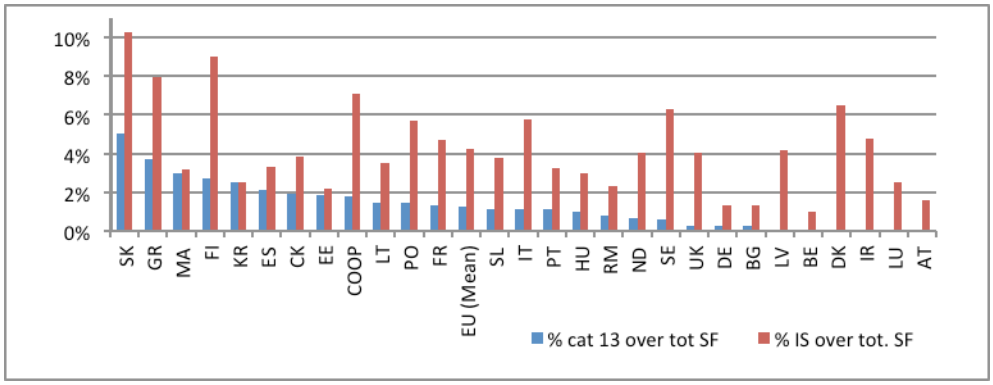
ERDF: European Regional Development Fund; ESF: European Social Fund
I.S.: Total resources dedicated to Information Society development;
CAT 13: Resources dedicated to public e-Services
CAT 13 / S.F.: Resources dedicated to public e-Services / Total amount of Structural Funds available
CONV = Convergence objective; COMP = Regional Competitiveness and Employment objective;
COOP = Cooperation objective
Source: Own elaboration from European Commission - DG for Regional Policy data

Fig. 2. Financial resources allocated by Member State, A.V.



CAT 13: Resources dedicated to public e-Services
Tot I.S.: Total resources dedicated to Information Society development;
Source: Own elaboration from European Commission - DG for Regional Policy data

Fig. 3. Financial resources allocated by Member State, in %



CAT 13: Resources dedicated to public e-Services
I.S.: Total resources dedicated to Information Society development;
Source: Own elaboration from European Commission - DG for Regional Policy data

Table 3. Categories of expenditure considered and financial resources allocated in CONV regions, as a % of the total resources dedicated to IS and e-Services development

Variable	Category	Name	Avg	Min	Max
broadband	10	Broadband networks	15.0	0	100
ICT	11 + 12	Information and communication technologies (including TEN)	25.4	0	100
e-Services	13	Services and applications for citizens	33.0	0	100
SME1	14	Services and applications for SMEs	16.5	0	100
SME2	15	Other measures for improving use of ICT by SMEs	9.9	0	100

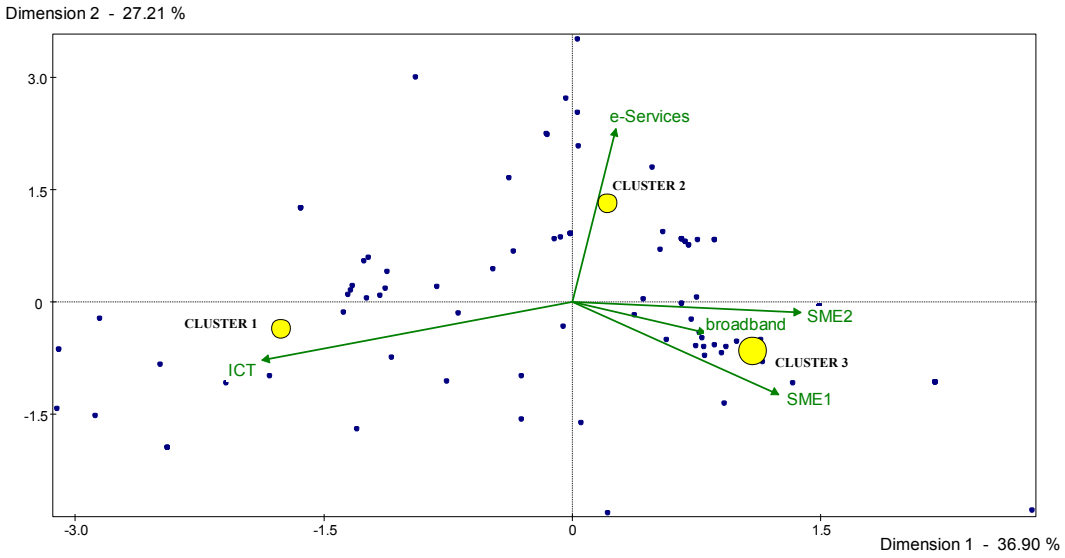
Source: Own elaboration from European Commission - DG for Regional Policy data

Table 4. Revealed dimensions from Principal Component Analysis

N.	Eigenvalues	%	Cum %
1	1.8448	36.9	36.9
2	1.3606	27.2	64.1
3	1.1293	22.6	86.7
4	0.6652	13.3	100
5	0	0	100

Source: Own elaboration from European Commission - DG for Regional Policy data

Fig. 4. Identifying three strategies in allocating financial resources for IS development in CONV Regions



Source: Own elaboration from European Commission - DG for Regional Policy data

Table 5. Percentage of financial resources dedicated to each IS category of expenditure in CONV regions, by cluster

Categories of expenditure	**Cluster 1 ICT infrastructures (interop., security, etc)** *(n = 29)*	**Cluster 2 e-Services (e-health, e-Gov, etc.)** *(n= 29)*	**Cluster 3 ICT SMEs and broadband** *(n = 49)*	**All CONV regions** *(n = 99)*
Broadband	5	10	25	15
ICT	59	13	10	25
eServices	23	55	24	33
SME1	6	11	27	16
SME2	5	10	13	10
Total	*100*	*100*	*100*	*100*

Source: Own elaboration from European Commission - DG for Regional Policy data

Table 6. CONV Regions of EU Countries and the three cluster revealed

Cluster 1 - ICT infrastructures (interoperability, security..)	**Cluster 2 - e-Services (e-health, e-Gov, etc.)**	**Cluster 3 - ICT among SMEs and broadband**
DE (all except Lüneburg and Thüringen), FR (Guyane and Guadelupe), HU, IT, LV, PT, SK	CZ, DE (Lüneburg), EE, ES (all except Castilla-la Mancha), GR, LT, MT	AT, BE, BG, DE (Thüringen), ES (Castilla-la Mancha), FR (Reunion and Martinique), PL, RO, SI, UK

Source: Own elaboration from European Commission - DG for Regional Policy data

Annex – Financial resources at regional level

Tab. 7. Cluster analysis on all European Regions: total IS (cat. 10-15)

Cluster 1	
ITF3	Italy
PL12	Poland
PL22	
SK02	Slov. Rep
SK03	
SK04	

Cluster 2	
GR11	Greece
GR30	
ITF4	Italy
ITG1	
LT00	Lithuania
LV00	Latvia
PL11	Poland
PL21	
PL31	
PL32	
PL33	
PL34	
PL41	
PL51	
PL61	
PL62	
PT11	Portugal
PT16	

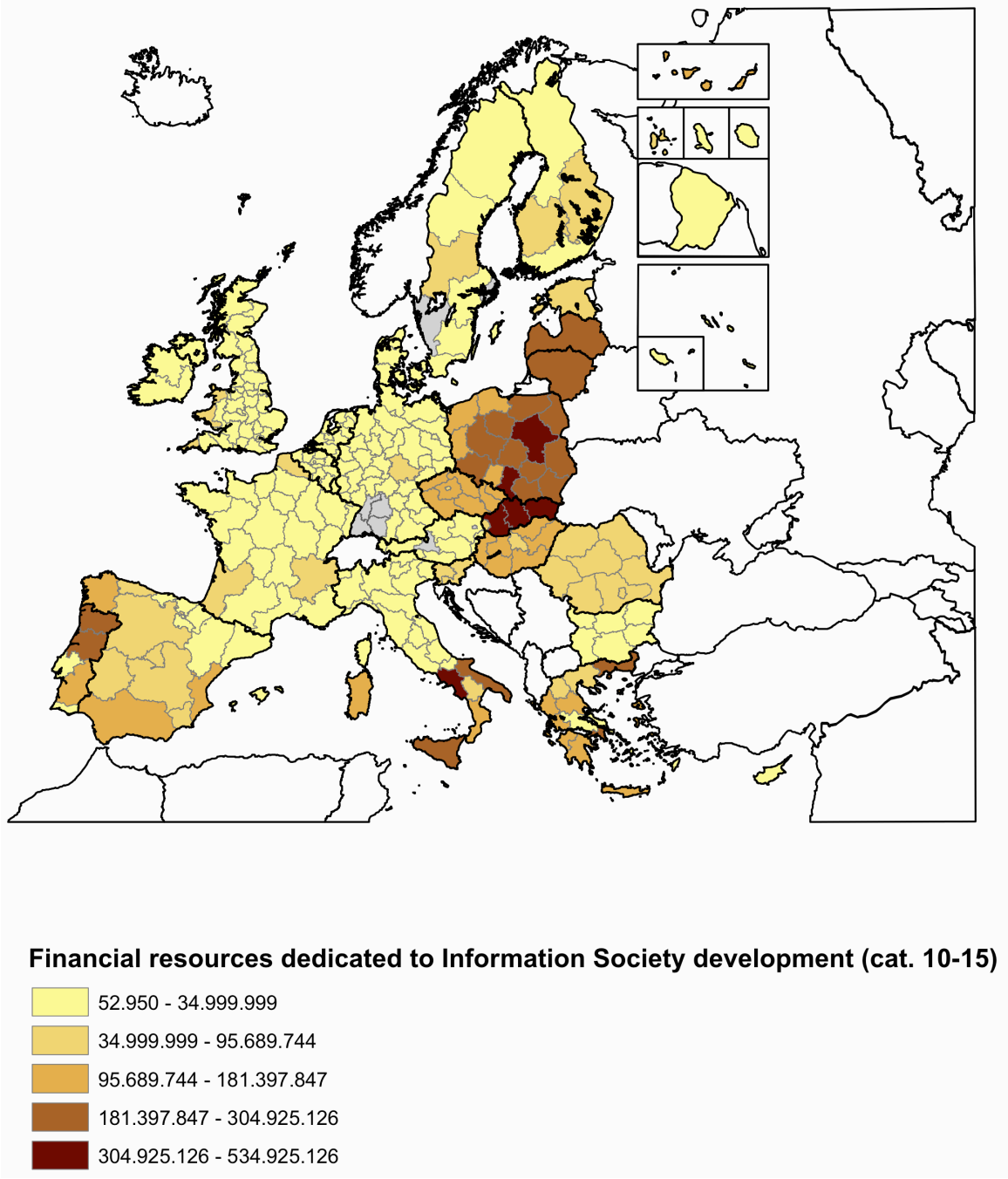
Cluster 3	
CZ02	Cz. Rep.
CZ03	
CZ04	
CZ05	
CZ06	
CZ07	
CZ08	
ES11	Spain
ES52	
ES61	
ES70	
GR14	Greece
GR21	
GR22	
GR23	
GR25	
GR41	
GR43	
HU21	Hungar.
HU22	
HU23	
HU31	
HU32	
HU33	
ITF6	Italy
ITG2	
PL42	Poland
PL43	
PL52	
PL63	
PT18	Portugal

Cluster 4	
CZ01	Cz. Rep.
DEG0	Germany
EE00	Estonia
ES12	Spain
ES30	
ES41	
ES42	
ES43	
ES62	
ES63	
ES64	
FI13	Finland.
FI19	
FR30	France
FR61	
FR71	
FR91	
GR12	Greece
GR13	
HU10	Hungar.
ITF5	Italy
RO11	Romania
RO12	
RO21	
RO22	
RO31	
RO32	
RO41	
RO42	
SE31	Sweden
SI01	Slovenia
SI02	
SK01	Slov. Rep.
UKK3	Un. King.
UKL1	

Cluster 5					
AT11	Austria	DEF0	Germania	MT00	Malta
AT12		DK01	Denmark	NL11	Netherl.
AT21		DK02		NL12	
AT22		DK03		NL13	
AT31		DK04		NL21	
AT33		DK05		NL22	
AT34		ES13	Spain	NL23	
BE10	Belgium	ES21		NL31	
BE21		ES22		NL32	
BE22		ES23		NL33	
BE23		ES24		NL34	
BE24		ES51		NL41	
BE25		ES53		NL42	
BE31		FI18	Finland	PT15	Portugal
BE32		FI1A		PT17	
BE33		FI20		PT20	
BE34		FR10	France	PT30	
BE35		FR21		SE12	Sweden
BG31	Bulgaria	FR22		SE21	
BG32		FR23		SE22	
BG33		FR24		SE32	
BG34		FR25		SE33	
BG41		FR26		UKC1	Un. King.
BG42		FR41		UKC2	
CY00	Cyprus	FR42		UKD1	
DE21	Deutch.	FR43		UKD2	
DE22		FR51		UKD3	
DE23		FR52		UKD4	
DE24		FR53		UKD5	
DE25		FR62		UKE1	
DE26		FR63		UKE2	
DE27		FR72		UKE3	
DE30		FR81		UKE4	
DE41		FR82		UKF1	
DE42		FR83		UKF2	
DE50		FR92		UKF3	
DE60		FR93		UKG1	
DE71		FR94		UKG2	
DE72		GR24	Greece	UKG3	
DE73		GR42		UKH1	
DE80		IE01	Ireland	UKH2	
DE91		IE02		UKH3	
DE92		ITC1	Italy	UKI1	
DE93		ITC2		UKI2	
DE94		ITC3		UKJ1	
DEA1		ITC4		UKJ2	
DEA2		ITD1		UKJ3	
DEA3		ITD2		UKJ4	
DEA4		ITD3		UKK1	
DEA5		ITD4		UKK2	
DEB1		ITD5		UKK4	
DEB2		ITE1		UKL2	
DEB3		ITE2		UKM2	
DEC0		ITE3		UKM3	
DED1		ITE4		UKM5	
DED2		ITF1		UKM6	
DED3		ITF2		UKN0	
DEE0		LU00	Luxemb.		

Source: Own elaboration from European Commission - DG for Regional Policy data

Fig. 5. Structural funds dedicated to Information Society development in 2007-13 period.



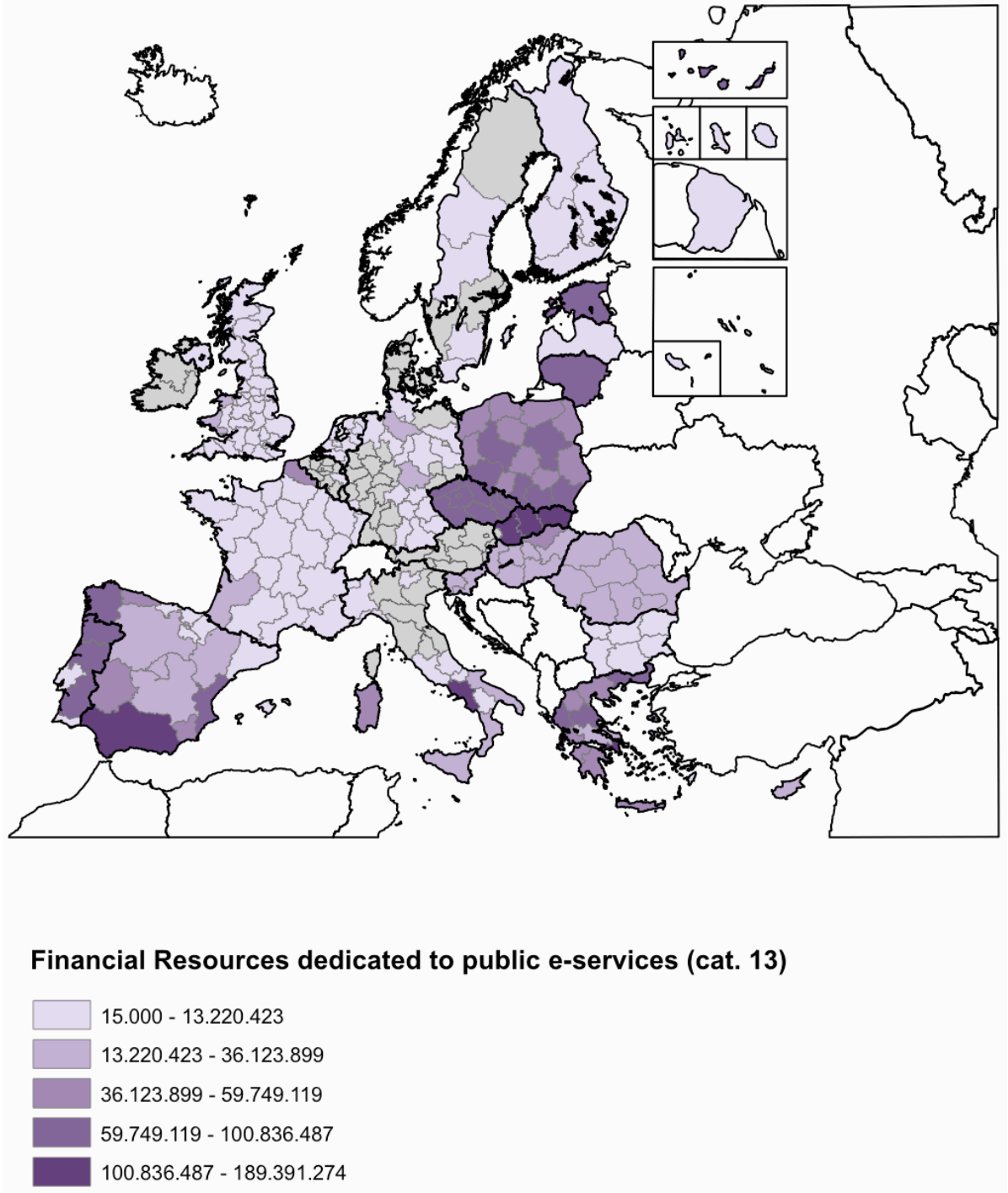
Source: Own elaboration from European Commission - DG for Regional Policy data

Tab. 8. Cluster analysis on all European Regions: public e-services (cat. 13)

Cluster 1		Cluster 2		Cluster 3		Cluster 4		Cluster 5					
ES61	Spain	ES12	Spain	CY00	Cyprus	CZ01	Cz. Rep.	BE33	Belgio	FR41	France	PT30	Portugal
GR30	Greece	ES43		DE93	Deutch.	CZ02		BG31	Bulgaria	FR42		SE21	Sweden
ITF3	Italy	ES62		DEG0		CZ03		BG32		FR43		SE22	
SK02	Slov. Rep	FR30	France	ES24	Spain	CZ04		BG33		FR51		SE31	
SK03		GR12	Greece	ES30		CZ05		BG34		FR52		SE32	
SK04		GR13		ES41		CZ06		BG41		FR53		UKC1	Un. King.
		GR22		ES42		CZ07		BG42		FR62		UKC2	
		GR23		ES63		CZ08		DE21	Deutch.	FR63		UKD1	
		GR25		ES64		EE00	Estonia	DE22		FR71		UKD2	
		GR41		FR61	France	ES11	Spain	DE23		FR72		UKD3	
		GR43		GR24	Greece	ES52		DE24		FR81		UKD4	
		HU31	Hungary	HU10	Hungary	ES70		DE25		FR82		UKD5	
		ITG2	Italy	HU21		GR11	Grecia	DE26		FR91		UKE1	
		PL11	Poland	HU22		GR14		DE27		FR92		UKE2	
		PL31		HU23		GR21		DE41		FR93		UKE3	
		PL33		HU32		LT00	Lithuania	DE42		FR94		UKE4	
		PL34		HU33		PL12	Poland	DE50		GR42	Greece	UKF1	
		PL42		ITF4	Italy	PL21		DE60		ITC1	Italy	UKF2	
		PL43		ITF6		PL22		DE91		ITC2		UKF3	
		PL52		ITG1		PL32		DE92		ITC3		UKG1	
		PL61		MT00	Malta	PL41		DE94		ITD2		UKG2	
		PL62		RO11	Romania	PL51		DEC0		ITE4		UKG3	
		PL63		RO12		PT11	Portogallo	DEE0		ITF1		UKH1	
				RO21		PT16		DEF0		ITF2		UKH2	
				RO22		PT18		ES13	Spain	ITF5		UKH3	
				RO31				ES21		LV00	Latvia	UKI1	
				RO32				ES22		NL11	Nederl.	UKI2	
				RO41				ES23		NL12		UKJ1	
				RO42				ES51		NL13		UKJ2	
				SI01	Slovenia			ES53		NL21		UKJ3	
				SI02				FI13	Finland	NL22		UKJ4	
				UKL1	Un. King.			FI18		NL23		UKK1	
								FI19		NL31		UKK2	
								FI1A		NL32		UKK3	
								FI20		NL33		UKK4	
								FR10	France	NL34		UKL2	
								FR21		NL41		UKM2	
								FR22		NL42		UKM3	
								FR23		PT15	Portugal	UKM5	
								FR24		PT17		UKM6	
								FR25		PT20		UKN0	
								FR26					

Source: Own elaboration from European Commission - DG for Regional Policy data

Fig. 6. Structural funds dedicated to public e-services development in 2007-13 period.



Source: Own elaboration from European Commission - DG for Regional Policy data

Tab. 8. EU Regional codes

AUSTRIA
1 AT11 Burgenland
2 AT12 Niederösterreich
3 AT13 Wien
4 AT21 Kärnten
5 AT22 Steiermark
6 AT31 Oberösterreich
7 AT32 Salzburg
8 AT33 Tirol
9 AT34 Vorarlberg

BELGIUM
10 BE10 Région de Bruxelles-Capitale/Brussels Hoofdst
11 BE21 Prov. Antwerpen
12 BE22 Prov. Limburg (B)
13 BE23 Prov. Oost-Vlaanderen
14 BE24 Prov. Vlaams Brabant
15 BE25 Prov. West-Vlaanderen
16 BE31 Prov. Brabant Wallon
17 BE32 Prov. Hainaut
18 BE33 Prov. Liège
19 BE34 Prov. Luxembourg (B)
20 BE35 Prov. Namur

BULGARIA
21 BG31 Severozapaden
22 BG32 Severen Tsentralen
23 BG33 Severoiztochen
24 BG34 Yugoiztochen
25 BG41 Yugozapaden
26 BG42 Yuzhen Tsentralen

CYPRUS
27 CY00 Cyprus

DENMARK
28 DK01 Hovedstaden
29 DK02 Sjælland
30 DK03 Syddanmark
31 DK04 Midtjylland
32 DK05 Nordjylland

ESTONIA
33 EE00 Estonia

FINLAND
34 FI13 Itä-Suomi
35 FI18 Etelä-Suomi
36 FI19 Länsi-Suomi
37 FI1A Pohjois-Suomi
38 FI20 Åland

FRANCE
39 FR10 Île de France
40 FR21 Champagne-Ardenne
41 FR22 Picardie
42 FR23 Haute-Normandie
43 FR24 Centre
44 FR25 Basse-Normandie
45 FR26 Bourgogne
46 FR30 Nord - Pas-de-Calais
47 FR41 Lorraine
48 FR42 Alsace
49 FR43 Franche-Comté
50 FR51 Pays de la Loire
51 FR52 Bretagne
52 FR53 Poitou-Charentes
53 FR61 Aquitaine
54 FR62 Midi-Pyrénées
55 FR63 Limousin
56 FR71 Rhône-Alpes
57 FR72 Auvergne
58 FR81 Languedoc-Roussillon
59 FR82 Provence-Alpes-Côte d'Azur
60 FR83 Corse
61 FR91 Guadeloupe
62 FR92 Martinique
63 FR93 Guyane
64 FR94 Réunion

GERMANY
65 DE11 Stuttgart
66 DE12 Karlsruhe
67 DE13 Freiburg
68 DE14 Tübingen
69 DE21 Oberbayern
70 DE22 Niederbayern
71 DE23 Oberpfalz
72 DE24 Oberfranken
73 DE25 Mittelfranken
74 DE26 Unterfranken
75 DE27 Schwaben
76 DE30 Berlin
77 DE41 Brandenburg - Nordost
78 DE42 Brandenburg - Südwest
79 DE50 Bremen
80 DE60 Hamburg
81 DE71 Darmstadt
82 DE72 Gießen
83 DE73 Kassel
84 DE80 Mecklenburg-Vorpommern
85 DE91 Braunschweig
86 DE92 Hannover
87 DE93 Lüneburg
88 DE94 Weser-Ems
89 DEA1 Düsseldorf
90 DEA2 Köln
91 DEA3 Münster
92 DEA4 Detmold
93 DEA5 Arnsberg
94 DEB1 Koblenz
95 DEB2 Trier
96 DEB3 Rheinhessen-Pfalz
97 DEC0 Saarland
98 DED1 Chemnitz
99 DED2 Dresden
100 DED3 Leipzig
101 DEE0 Sachsen-Anhalt
102 DEF0 Schleswig-Holstein
103 DEG0 Thüringen

GREECE
104 GR11 Anatoliki Makedonia, Thraki
105 GR12 Kentriki Makedonia
106 GR13 Dytiki Makedonia
107 GR14 Thessalia
108 GR21 Ipeiros
109 GR22 Ionia Nisia
110 GR23 Dytiki Ellada
111 GR24 Sterea Ellada
112 GR25 Peloponnisos
113 GR30 Attiki
114 GR41 Voreio Aigaio
115 GR42 Notio Aigaio
116 GR43 Kriti

IRELAND
117 IE01 Border, Midlands and Western
118 IE02 Southern and Eastern

ITALY
119 ITC1 Piemonte
120 ITC2 Valle d'Aosta/Vallée d'Aoste
121 ITC3 Liguria
122 ITC4 Lombardia
123 ITD1 Provincia Autonoma Bolzano-Bozen
124 ITD2 Provincia Autonoma Trento
125 ITD3 Veneto
126 ITD4 Friuli-Venezia Giulia
127 ITD5 Emilia-Romagna
128 ITE1 Toscana
129 ITE2 Umbria
130 ITE3 Marche
131 ITE4 Lazio
132 ITF1 Abruzzo
133 ITF2 Molise
134 ITF3 Campania
135 ITF4 Puglia
136 ITF5 Basilicata
137 ITF6 Calabria
138 ITG1 Sicilia
139 ITG2 Sardegna

LATVIA
140 LV00 Latvia

LITHUANIA
141 LT00 Lithuania

LUXEMBOURG
142 LU00 Luxembourg (Grand-Duché)

MALTA
143 MT00 Malta

NETHERLANDS
144 NL11 Groningen
145 NL12 Friesland
146 NL13 Drenthe
147 NL21 Overijssel
148 NL22 Gelderland
149 NL23 Flevoland
150 NL31 Utrecht

151 NL32 Noord-Holland
152 NL33 Zuid-Holland
153 NL34 Zeeland
154 NL41 Noord-Brabant
155 NL42 Limburg (NL)

POLAND
156 PL11 Lódzkie
157 PL12 Mazowieckie
158 PL21 Malopolskie
159 PL22 Slaskie
160 PL31 Lubelskie
161 PL32 Podkarpackie
162 PL33 Swietokrzyskie
163 PL34 Podlaskie
164 PL41 Wielkopolskie
165 PL42 Zachodniopomorskie
166 PL43 Lubuskie
167 PL51 Dolnoslaskie
168 PL52 Opolskie
169 PL61 Kujawsko-Pomorskie
170 PL62 Warminsko-Mazurskie
171 PL63 Pomorskie

PORTUGAL
172 PT11 Norte
173 PT15 Algarve
174 PT16 Centro (PT)
175 PT17 Lisboa
176 PT18 Alentejo
177 PT20 Acores-Azzorre
178 PT30 Madeira

UNITED KINGDOM
179 UKC1 Tees Valley and Durham
180 UKC2 Northumberland, Tyne and Wear
181 UKD1 Cumbria
182 UKD2 Cheshire
183 UKD3 Greater Manchester
184 UKD4 Lancashire
185 UKD5 Merseyside
186 UKE1 East Riding and North Lincolnshire
187 UKE2 North Yorkshire
188 UKE3 South Yorkshire
189 UKE4 West Yorkshire
190 UKF1 Derbyshire and Nottinghamshire
191 UKF2 Leicestershire, Rutland and Northants
192 UKF3 Lincolnshire
193 UKG1 Herefordshire, Worcestershire and Warks
194 UKG2 Shropshire and Staffordshire
195 UKG3 West Midlands
196 UKH1 East Anglia
197 UKH2 Bedfordshire, Hertfordshire
198 UKH3 Essex
199 UKI1 Inner London
200 UKI2 Outer London
201 UKJ1 Berkshire, Bucks and Oxfordshire
202 UKJ2 Surrey, East and West Sussex
203 UKJ3 Hampshire and Isle of Wight
204 UKJ4 Kent
205 UKK1 Gloucestershire, Wiltshire and North Somerset
206 UKK2 Dorset and Somerset
207 UKK3 Cornwall and Isles of Scilly
208 UKK4 Devon
209 UKL1 West Wales and The Valleys
210 UKL2 East Wales
211 UKM2 Eastern Scotland
212 UKM3 South Western Scotland
213 UKM5 North Eastern Scotland
214 UKM6 Highlands and Islands
215 UKN0 Northern Ireland

CZECH REPUBLIC
216 CZ01 Praha
217 CZ02 Strední Cechy
218 CZ03 Jihozápad
219 CZ04 Severozápad
220 CZ05 Severovýchod
221 CZ06 Jihovýchod
222 CZ07 Strední Morava
223 CZ08 Moravskoslezko

SLOVAKIA
224 SK01 Bratislavský
225 SK02 Západné Slovensko
226 SK03 Stredné Slovensko
227 SK04 Východné Slovensko

ROMANIA
228 RO11 Nord-Vest
229 RO12 Centru
230 RO21 Nord-Est
231 RO22 Sud-Est
232 RO31 Sud - Muntenia
233 RO32 Bucuresti - Ilfov
234 RO41 Sud-Vest Oltenia
235 RO42 Vest

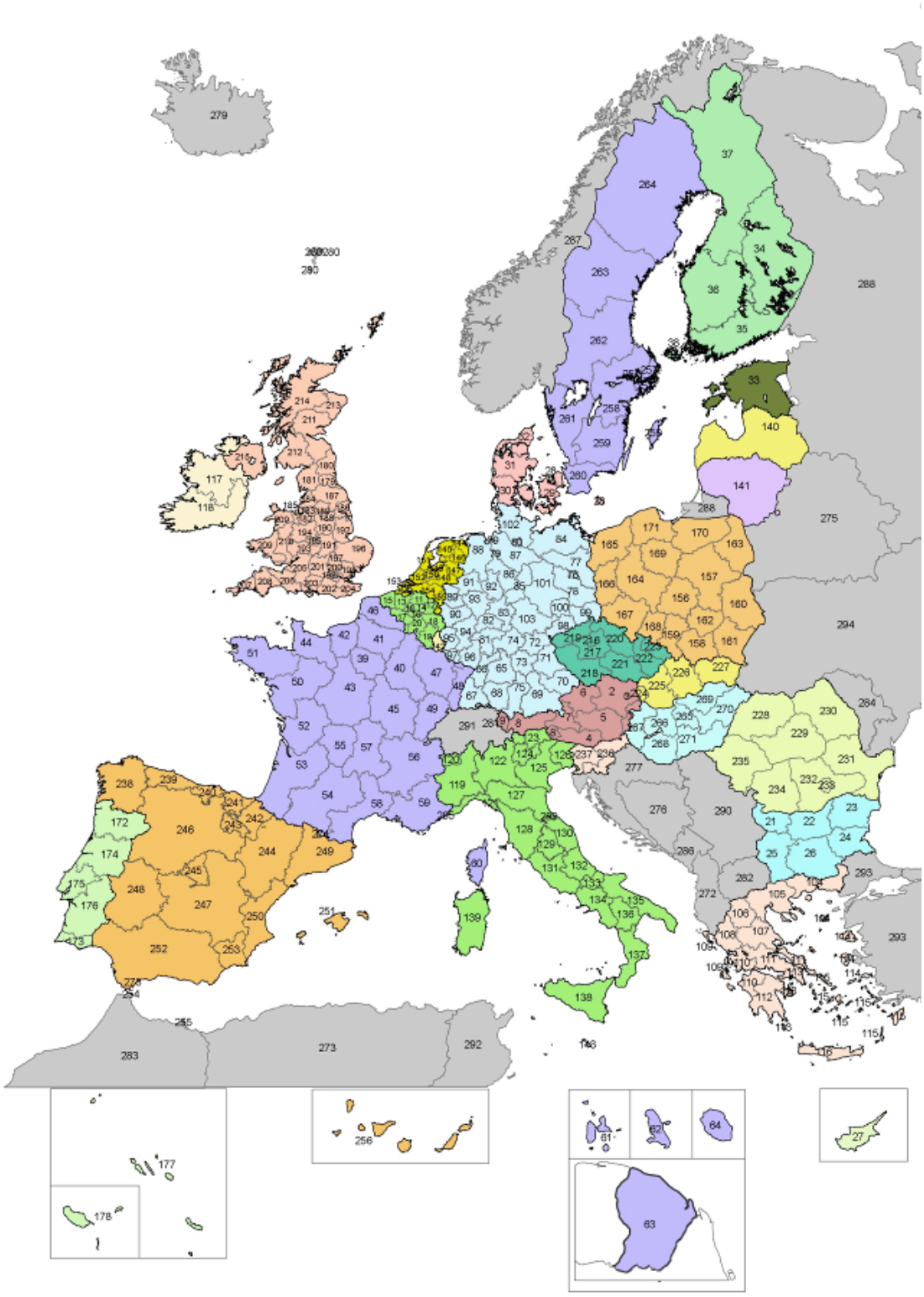
SLOVENIA
236 SI01 Vzhodna Slovenija
237 SI02 Zahodna Slovenija

SPAIN
238 ES11 Galicia
239 ES12 Principado de Asturias
240 ES13 Cantabria
241 ES21 Pais Vasco
242 ES22 Comunidad Foral de Navarra
243 ES23 La Rioja
244 ES24 Aragón
245 ES30 Comunidad de Madrid
246 ES41 Castilla y León
247 ES42 Castilla-la Mancha
248 ES43 Extremadura
249 ES51 Cataluña
250 ES52 Comunidad Valenciana
251 ES53 Illes Balears
252 ES61 Andalucia
253 ES62 Región de Murcia
254 ES63 Ciudad Autónoma de Ceuta (ES)
255 ES64 Ciudad Autónoma de Melilla (ES)
256 ES70 Canarias

SWEDEN
257 SE11 Stockholm
258 SE12 Östra Mellansverige
259 SE21 Småland med öarna
260 SE22 Sydsverige
261 SE23 Västsverige
262 SE31 Norra Mellansverige
263 SE32 Mellersta Norrland
264 SE33 Övre Norrland

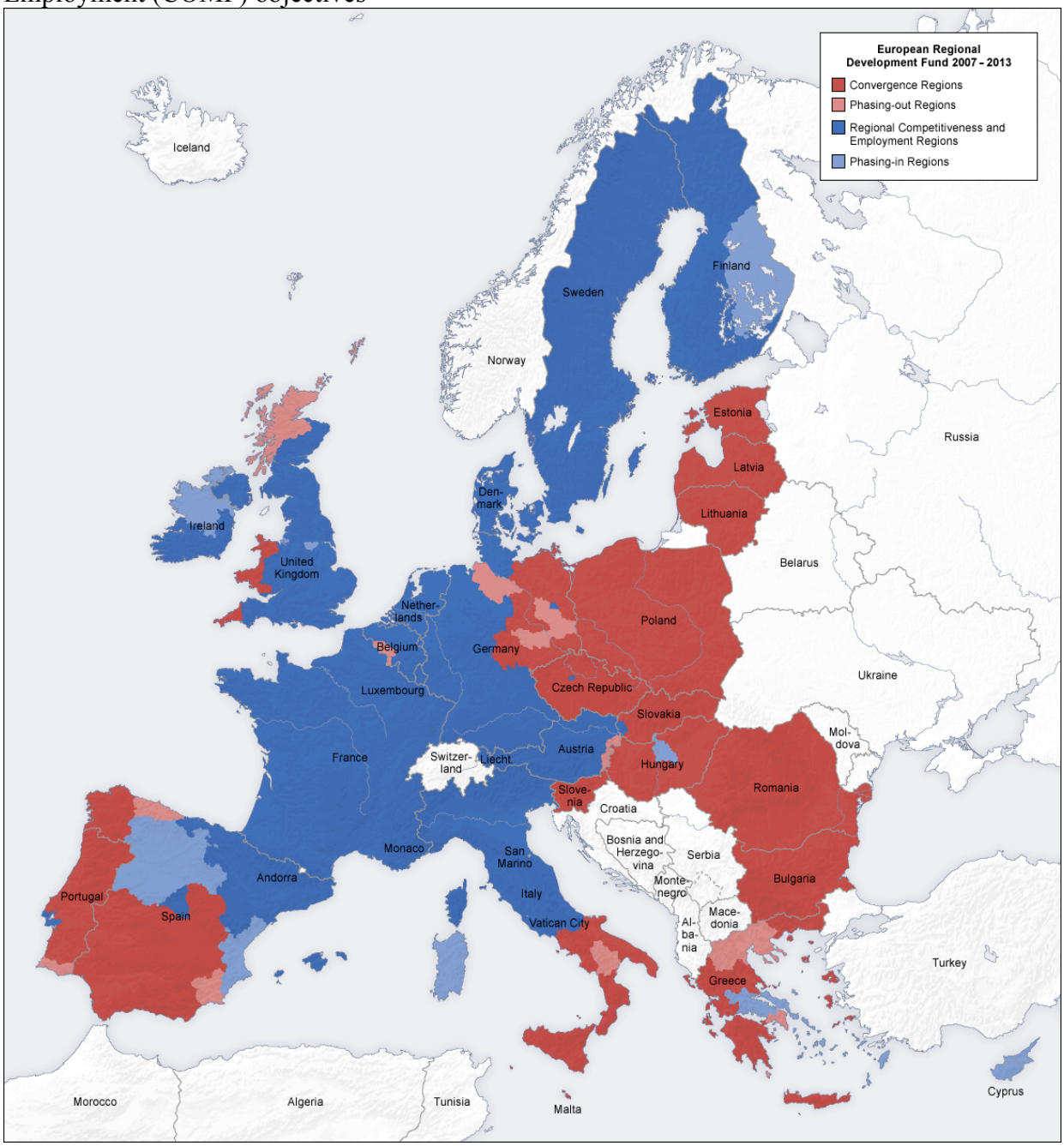
HUNGARY
265 HU10 Közép-Magyarország
266 HU21 Közép-Dunántúl
267 HU22 Nyugat-Dunántúl
268 HU23 Dél-Dunántúl
269 HU31 Észak-Magyarország
270 HU32 Észak-Alföld
271 HU33 Dél-Alföld

Fig. 7. EU Regional codes



Source: Ministry of Economic Development, Department for Development and Economic Cohesion (2010). Annual Report on Actions in Under-Utilised Areas 2009, Rome, Italy

Fig. 8. EU Regions belonging to Convergence (CONV) and Regional Competitiveness and Employment (COMP) objectives



Source: European Commission, DG for Regional Policy